BROOKHAVEN NATIONAL LABORATORY

Work Permit # DRL-2012- 20 /SS-2012-
Work Order # _____
Job# _____ Activity# _____

See "Instructions for Filling out the Work Permit" contained in the Work Planning and Control for Experiments and Operations Subject Area.

1. Work request WCC fills out this section. ☐ **Standing Work Permit**

Requester: Don Lynch	Date: 9/19/2012	Ext.: 2253	Dept/Div/Group: PO/PHENIX
Other Contact person (if different from requester): Carter Biggs			Ext.: 7515
Work Control Coordinator: Don Lynch		Start Date:	Est. End Date: 10/31/2012
Brief Description of Work: Replace DC West Window, Repair broken wires in DC West Chamber			
Building: 1008	IR	Equipment: DC West	Service Provider PHENIX Techs & DC Experts

2. WCC, Requester/Designee, Service Provider, and ESS&H (as necessary) fill out this section or attach analysis

ESS&H ANALYSIS

Radiation Concerns	☒ None	☐ Activation	☐ Airborne	☐ Contamination	☐ Radiation	☐ NORM	☐ Other
☐ Special nuclear materials involved, notify Isotope Special Materials Group			☐ Fissionable/Radiological materials involved, notify Laboratory Nuclear Safety Officer				
Radiation Generating Devices:	☐ Radiography		☐ Moisture Density Gauges		☐ Soil Density Gauges		☐ X-ray Equipment

Safety and Security Concerns	☐ None	☐ Explosives	☐ Transport of Haz/Rad Material	☐ Pressurized Systems
☐ Adding/Removing Walls or Roofs	☐ Critical Lift	☐ Fumes/Mist/Dust*	☐ Magnetic Fields*	☐ Railroad Work
☐ Asbestos*	☐ Cryogenic	☐ Heat/Cold Stress	☐ Nanomaterials/particles*	☐ Rigging
☐ Beryllium*	☐ Electrical	☐ Hydraulic	☐ Noise*	☐ Silica*
☐ Biohazard*	☒ Elevated Work	☐ Lasers*	☐ Non-ionizing Radiation*	☐ Security Concerns
☐ Chemicals/Corrosives*	☐ Excavation	☐ Lead*	☐ Oxygen Deficiency*	☐ Suspect/Counterfeit Items
☐ Confined Space*	☐ Ergonomics*	☒ Material Handling	☐ Penetrating Fire Walls	☐ Vacuum
* Safety Health Rep. Review Required	☐ Haz, Rad, Bio Material Exceed DOE 151.1-C Levels - Contact OEM			☐ Other

Environmental Concerns	☒ None	☐ Work impacts Environmental Permit No.	
☐ Atmospheric Discharges (rad/non-rad)	☐ Land Use Institutional Controls	☐ Soil Activation/contamination	☐ Waste-Mixed
☐ Chemical or Rad Material Storage or Use	☐ Liquid Discharges	☐ Waste-Clean	☐ Waste-Radioactive
☐ Cesspools (UIC)	☐ Oil/PCB Management	☐ Waste-Hazardous	☐ Waste-Regulated Medical
☐ High water/power consumption	☐ Spill potential	☐ Waste-Industrial	☐ Underground Duct/Piping
Waste disposition by:			☐ Other
Pollution Prevention (P2)/Waste Minimization Opportunity:	☒ No ☐ Yes		

FACILITY CONCERNS	☒ None	☐ Intermittent Energy Release		
☐ Access/Egress Limitations	☐ Electrical Noise	☐ Potential to Cause a False Alarm		☐ Vibrations
	☐ Impacts Facility Use Agreement		☐ Temperature Change	☐ Other
☐ Configuration Management	☐ Maintenance Work on Ventilation Systems		☐ Utility Interruptions	

WORK CONTROLS

Work Practices

☐ None	☐ Exhaust Ventilation	☒ Lockout/Tagout	☐ Spill Containment	☐ Security (see Instruction Sheet)
☒ Back-up Person/Watch	☐ HP Coverage	☐ Posting/Warning Signs	☐ Time Limitation	☐ Other
☐ Barricades	☐ IH Survey	☒ Scaffolding-requires inspection	☐ Warning Alarm (i.e. "high level")	☐ Electrical Inspection Required

Personal Protective Equipment

☐ None	☐ Ear Plugs	☒ Gloves as appropriate	☐ Lab Coat	☒ Safety Glasses as appropriate
☐ Coveralls	☐ Ear Muffs	☐ Goggles	☐ Respirator*	☐ Safety Harness

☐ Disposable Clothing	☐ Face Shield	☐ Hard Hat	☐ Shoe Covers	☒ Safety Shoes	☐ High visibility cloths/vest	☐ Other

Permits Required (Permits must be valid when job is scheduled.)

☒ None	☐ Cutting/Welding	☐ Impair Fire Protection Systems
☐ Concrete/Masonry Penetration	☐ Digging/Core Drilling	☐ Rad Work Permit-RWP No
☐ Confined Space Entry	☐ Electrical Working Hot	☐ Other

Dosimetry/Monitoring

☒ None	☐ Heat Stress Monitor	☐ Real Time Monitor	☐ TLD
☐ Air Effluent	☐ Noise Survey/Dosimeter	☐ Self-reading Pencil Dosimeter	☐ Waste Characterization
☐ Ground Water	☐ O_2/Combustible Gas	☐ Self-reading Digital Dosimeter	☐ Other
☐ Liquid Effluent	☐ Passive Vapor Monitor	☐ Sorbent Tube/Filter Pump	

Training Requirements (List specific training requirements)

PHENIX Awareness, C-A User or equivalent, scaffold training, ladder training

Based on analysis above, the Review Team determines the risk, complexity, and coordination ratings below:				**If using the permit when all hazard ratings are low, only the following need to sign: (Although allowed, there is no need to use back of form)**	
ESS&H Risk Level:	☒ Low	☐ Moderate	☐ High	WCC:	Date:
Complexity Level:	☐ Low	☒ Moderate	☐ High	Service Provider:	Date:
Work Coordination:	☐ Low	☒ Moderate	☐ High	Authorization to start	Date:
				(Department/Division, or their equivalent, Sup/WCC/Designee)	

3. Both work requester and service provider contribute to work plan (use attachments for detailed plans)

Work Plan (procedures, timing, equipment, scheduling, coordination, notifications, and personnel availability need to be addressed in adequate detail): See Attached work plan description
Special Working Conditions Required (e.g., Industrial Hygiene hold points or other monitoring) None
Notifications to operations and Operational Limits Requirements: None
Post Work Testing, Notification or Documentation Required:

Job Safety Analysis Required: ☐ Yes ☒ No	Review Done: ☒ in series ☐ team

Reviewed by: * Primary Reviewer signature means that the Review Team members were appropriate for the work that was planned, the Team visited the job site, hazards and risks that could impact ESS&H have been considered and controls established according to BNL requirements. In addition, this signature indicates that applicable JRAs, FRAs, as well as other planning documents have been reviewed and training requirements have been identified and recorded on this permit.

Title	Name (print)	Signature	Life #	Date
ES&H Professional				
F&O Facility Project Manager				
Service Provider				
Work Control Coordinator	Don Lynch		20146	
Safety Health Representative				
Research Space Manager				
Other				
Other (PHENIX Escort)				
Required Walkdown Completed				
*Primary Reviewer				

4. Job site personnel (Supervisor and workers) fill out this section.

Note: Signature indicates personnel performing work have read and understand the hazards and permit requirements (including any attachments) and all training required for this permit is current/complete. Job Supervisor/Contractor Supervisor signatures also includes verification that worker training required for this permit is current/complete.

Job Supervisor:		Contractor Supervisor:	
Workers:	Life#:	Workers :	Life#:

Workers are encouraged to provide feedback on ESS&H concerns or on ideas for improved job work flow. Use feedback form or space below.

5. Department/Division, or their equivalent, Line Manager or Designee

Conditions are appropriate to start work: (Permit has been reviewed, work controls are in place and site is ready for job.)

Name:	Signature:	Life#:	Date:

6. Worker provides feedback.

Worker Feedback (use attached sheets as necessary)

a) WCM/WCC: Are there any changes as a result of worker feedback? ☐ Yes ☐ No

Note: See Work Planning and Control for Experiments and Operations Subject Area section 2.6.

7. Post Job Review/Closeout: Work Control Coordinator (authorizing dept.) checks quality of completed permit and ensures the work site is left in an acceptable condition. (WCC can delegate clean up of job site to work supervisor.) The WCC ensures that the change process to update drawings, placards, postings, procedures, etc., is initiated, if necessary.

Name:	Signature:	Life#:	Date:
Comments:			

Attachment to W.P. #DRL-2012-20/SS September 19, 2012

DC W repairs in the PHENIX Experimental Hall (bldg. 1008).

Problem

Years of wire repairs on the DC west have rendered the DC west window a patchwork of tape and have elevated leak rates to the point where replacement of the mylar window is needed. The design of the DC west window is slightly different from the DC east which has an improved window support structure and sealing concept. These improvements are to be incorporated into the DC West this summer. In addition, while the window is removed, any broken wires found will be removed as well.

The techniques to affect these repairs have been established by the DC group experts in a prior shutdown when the DC East Window was replaced and in yearly maintenance to remove broken wires and are handled as worker-planned work within the guidelines of the PHENIX Awareness training.

The procedure by which this repair will be accomplished is provided below.

Work Plan

This work is to be done by fully trained and experienced personnel (PHENIX mechanical and electrical technicians and DC expert scientists) during the 2012 maintenance shutdown period and is expected to require about 3-4 weeks.

Prior to Repairs

1. PHENIX engineering shall design suitable work platforms from which the window replacement and wire repairs can be safely, effectively and efficiently accomplished. The design and structural calculations shall be submitted to C-AD engineering for review and approval.

2. PHENIX engineering shall design a suitable enclosure over the DC west and the work platforms to minimize the chances of dust particles invading the DC west chamber while the window is removed. The enclosure shall crate a “clean room-tent” and shall include a heap filter blowing down from the top to create a positive pressure in the tent. The filter and tenting material shall be mounted to the top of the DC work platform and DC itself.

3. At least 48 hours prior to the commencement of the subject repairs, all power to the detector shall be turned off and the flow of gas shall be turned off.

4. All personnel involved in these repairs shall have PHENIX awareness training, C-A User or equivalent training, scaffold user training and ladder user training. In addition, personnel shall have appropriate skill training as required to accomplish the subject repairs as worker planned work.

Repair

5. DC experts will access the face of the DC west magnet using the custom designed work platforms described above, reaching the first level of the work platform via the Central Magnet (CM) hydraulic lift table.

6. PHENIX technicians and DC experts shall cut and remove the retaining strings from the face of the DC detector, then remove the frame hardware and frames holding the window.

7. Technicians shall then clean an epoxy residue from the fastening studs, repairing and or replacing studs as necessary.

8. DC experts shall look for broken wires throughout the DC West cavity and individually locate the coiled broken wires.

9. Once a broken wire is located it shall be carefully uncoiled from any intact wires it has become wrapped around, pulled out through DC Face and clipped at its end mounting point(s).

10. Steps 8-9 shall be repeated as necessary until all broken wires have been removed entirely from the cavity and clipped at each end mounting point.

11. After all wires have been removed as described, the new mylar window shall be stretched across the face and mounted using the new frames, mounting hardware and gasket material (see drawings). Fasteners shall be tightened to achieve a firm seal on all 4 edges of the window.

12. After the window has been sealed the retaining strings shall be tightly serpentined around each of the pins to provide support for the window when pressurized.

13. After the window retaining strings have been installed, nitrogen flow shall be re-instated and pressure brought to operating parameters.

14. At this point the detector shall be fully tested for leaks, and, if necessary, tape and adhesive shall be applied/augmented until any leak has been sealed to acceptable levels (per PHENIX DC/PC Gas System Operating Procedure PP-2.5.2.04-04 rev A).

15. After completion of leak tests, remove the tent, filters and work platforms and store appropriately for future use.

16. Only after leak levels are acceptable shall flammable gas mixture be re-introduced. (Note: flammable gas shall not be introduced until the end of the shutdown when PHENIX blue sheet tests have been completed and the integrity of all PHENIX gas system safety controls has been verified and documented in accordance with PHENIX/C-AD OPM # 11.2.3 PHENIX Flammable Gas System Operating Procedure.

17. Once flammable gas has been re-started , check again with high sensitivity gas detection equipment to verify that leak rates are within allowable range.

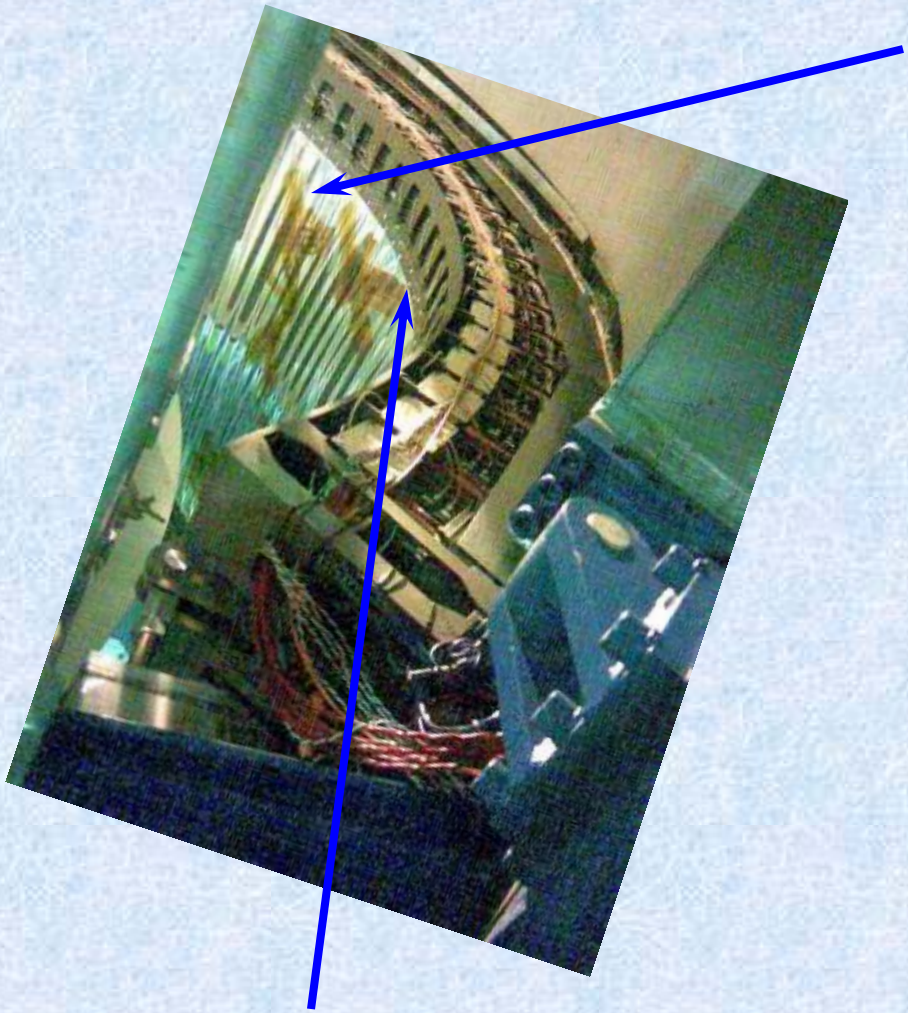
18. Post repairs work closeout

    After all repairs and tests are completed, The DC east and/or west shall be restored to its normal operating position (if necessary) on the DC support rails.

    Any lessons learned, problems encountered and their solutions should be recorded in the appropriate section of the work permit to which this procedure is attached.

DC West Repairs/Upgrade

DC West Repairs/Upgrade



Years of wire repairs on the DC west have rendered the DC west window a patchwork of tape and have elevated leak rates to the point where replacement of the mylar window is needed. The design of the DC west window is slightly different from the DC east which has an improved window support structure and sealing concept. These improvements are to be incorporated into the DC West this summer.

Sealing/window mounting plates (both sides)

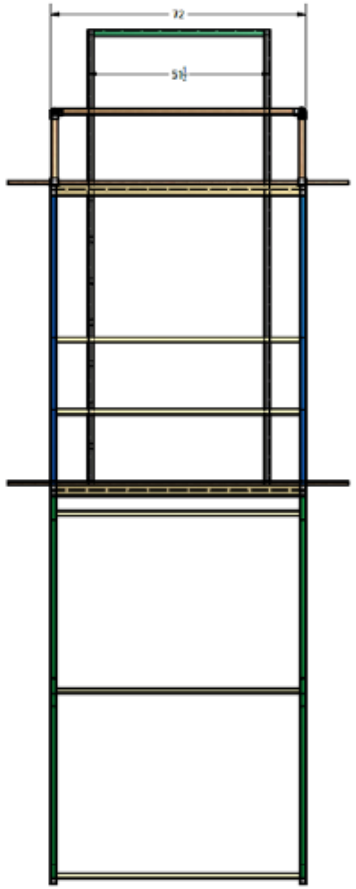
DC West Repairs/Upgrade

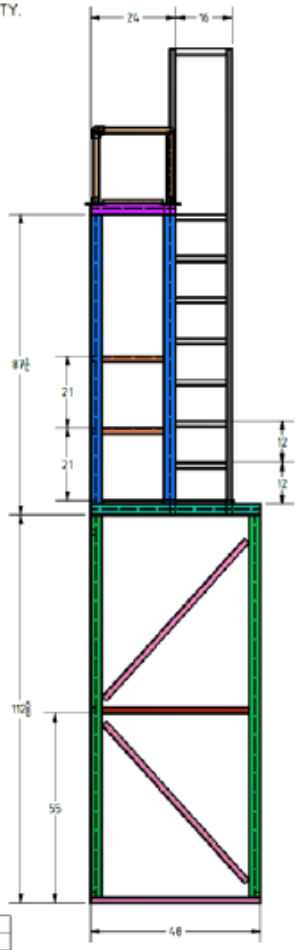
The plan for the DC West Repairs is as follows:

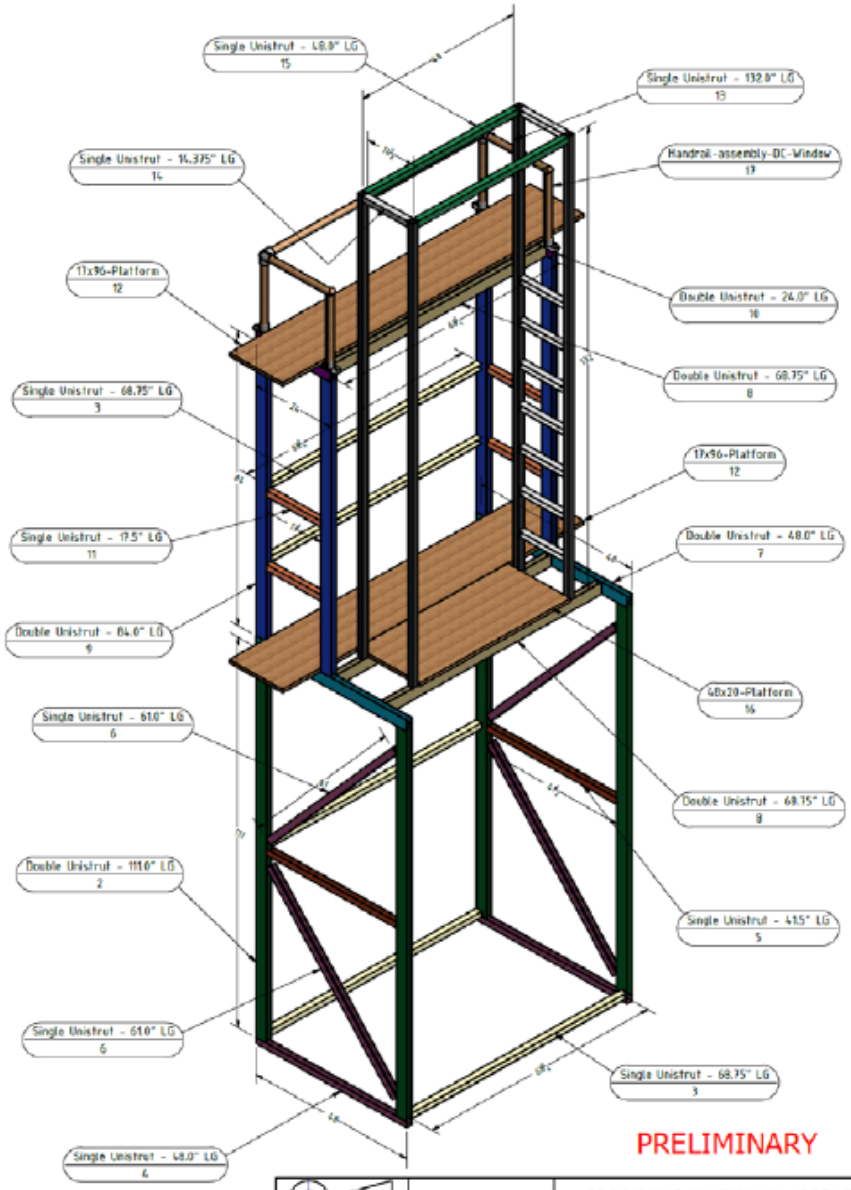
- Gather drawings and materials from DC group
- Make measurements, new drawings and create parts lists as necessary
- Procure/fabricate parts
- Design work platforms and protective covering to access and protect DC west during disassembly/ reassembly. CAD review.
- Disassemble existing window and sealing components
- Repair/remove broken wires, etc.
- Install new window and seal.
- Leak and functioal tests

NOTES:

1. MATERIAL: UNISTRUT FRAMING SYSTEM: 1-5/8" x 3-1/4", 12 Gage Back-to-Back, Solid.
2. ANGLE FITTINGS: (4-HOLE) P1325 ON ALL LOAD BEARING COLUMNS.
3. INSTALL 4" TALL KICK PLATES ON EACH PLATFORM AS NECESSARY.
4. ALL BOLTS TO BE 3/8"-16 OR LARGER.
   TORQUE SPECS: 3/8"-16 BOLTS - 25ft/lbs. MAX
   1/2"-13 BOLTS - 70ft/lbs MAX
5. WORK PLATFORM TO BE SECURED TO MUON MAGNET FOR INCREASED RIGIDITY.







PRELIMINARY

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
2	4	Unistrut-DCW-2	Double Unistrut - 111.0" LG
3	6	Unistrut-DCW-4	Single Unistrut - 68.75" LG
4	2	Unistrut-DCW-3	Single Unistrut - 48.0" LG
5	2	Unistrut-DCW-5	Single Unistrut - 41.5" LG
6	4	Unistrut-DCW-6	Single Unistrut - 61.0" LG
7	2	Unistrut-DCW-11	Double Unistrut - 48.0" LG
8	3	Unistrut-DCW-12	Double Unistrut - 68.75" LG
9	4	Unistrut-DCW-7	Double Unistrut - 84.0" LG
10	2	Unistrut-DCW-1	Double Unistrut - 24.0" LG
11	4	Unistrut-DCW-13	Single Unistrut - 17.5" LG
12	2	17x96-Platform	17x96-Platform
13	4	Unistrut-DCW-14	Single Unistrut - 132.0" LG
14	9	Unistrut-DCW-15	Single Unistrut - 14.375" LG
15	2	Unistrut-DCW-16	Single Unistrut - 48.0" LG
16	1	48x20-Platform	48x20-Platform
17	1	Handrail-assembly-DC-Window	Handrail-assembly-DC-Window

REV			
SHEET			
REVISION STATUS OF SHEETS			

THIRD ANGLE PROJECTION

NEXT ASSEMBLY

BROOKHAVEN NATIONAL LABORATORY
Upton, NY 11973

PROJECT: PHENIX

DESIGN

DRAWING NAME: DC Window Platform v2

SIZE: C

DRAWING NUMBER: 105-0204-902

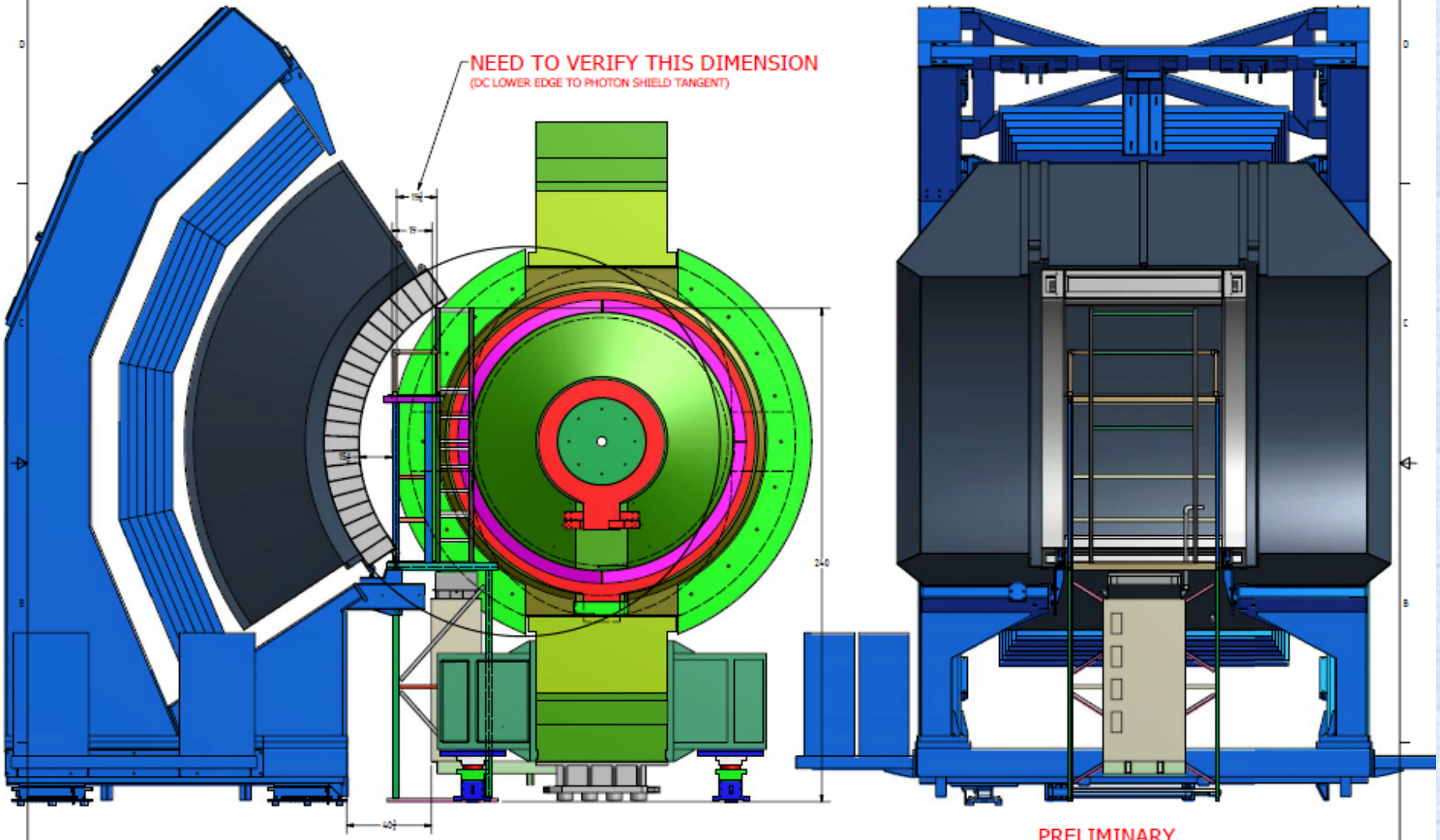
REV:

B.O. CATEGORY

SCALE

WEIGHT

SHEET 2 OF 2



PRELIMINARY

BROOKHAVEN NATIONAL LABORATORY
Upton, NY 11973

PHENIX

105-0204-902

C

THIRD ANGLE PROJECTION

NEXT ASSEMBLY

REV

SHEET

REVISION STATUS OF SHEETS